An Efficient Bandwidth Solution for Live Conference System

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Abstract

There are some limitations when implementing a live conference system, especially in developing countries such as Indonesbenefitia. The main problem is due to the Internet connection bandwith. In establishing an ideal live conference, we have to allocate bigger bandwidth to transmit a large amount of data, including audio and video. Our proposed solution is an efficient live conference system which can be implemented in a low bandwidth environment. The solution is built in web environment so that people can access it easily and can reach broader participants. We employ Open Source software and technology to develop the website and we deliver the open paradigm as well for the content. People who are interested in authors work can watch their presentation and download their files.
Keywords: conference system, low bandwidth, online repository

1 Introduction

Conferences are often held to gather people from same interest so that they can talk and discuss about their matters together. Especially in scientific conference, where people from different level start from students, teachers, academicians to industrial experts meet and share their knowledge and experiences. Sometimes, from that meeting they can propose to do something new, in term of research and innovation. The motivation to do that is they can meet people from the same interest so that they can share and propose a new way to do something.

Conference is held in one place and to attend such conference, participant have to go to that place. It means that they require time and money and for some people having limitation to go there, attending a conference could be impossible. Sometime, the problem is not only about the funding. The problem occur when people want to attend more than one conference at the same time or even they want to attend one conference but at the same time they have to go for another business.

Live conference (or teleconference) is suggested as an improvement of conventional conferences. It can capture broader participants, cost- and time-effective, faster knowledge dissemination, and border-less coverage. People can attend more than one conferences at the same time because they can access and join conference directly by live. People also do not have to go to one place to attend conference thus more time and cost effective.

But, there are some limitations when implementing an ideal live conference system, especially in developing country like Indonesia. The main problem is because of the Internet connection bandwith. To establish an ideal live conference, we have to allocate wider bandwidth to transmit a large amount of data, including audio and video. Although there are so many solutions exist regarding to live conference system, most of them are proprietary and sophisticated thus need experienced users to operate and manage. This paper try to propose a live conference system which can be implemented in low bandwidth environment, easy to manage, flexible and cheap.

This paper is arranged as follows: Chapter 1 introduce the real situation when implementing conference. Chapter 2 describes our proposed methodology whilst Chapter 3 explain how to implement it in a real world. Finally, Chapter 5 concludes this paper.

2 Methodology

Our proposed solution is to develop a live conference system which can be implemented in a low bandwidth environment. The solution will be built in web environment so that people can access it easily and can reach broader participant. This solution supports the openness paradigm in term of solution used to develop the application and the

content. We use Open Source software and technology to develop the website and we deliver the open paradigm as well for the content. People who are interested in authors work can watch their presentation and get their files. We try to disseminate knowledge in more efficient way: **online conference system and repository**.

To deliver the best solution, we did the preliminary analysis by considering several factors:

1. **We have to only provide functions which are really needed by the application, throwing away unneeded functions.** The main reason people to use our conference system is only to watch, listening, and download the presentation so that we have to only focus on this basic requirements.

2. **Because we need relatively high bandwidth to transmit and receive data during online presentation, we should minimize graphics or icons in the pages.** A lot of graphics and fancy icons can make our system more interesting. But, we have to look at the intention of people to use our system. They only interested in watching and listening the presentation, not the website itself. By minimizing the graphics and icon appear in the pages we can more focus on how to transmit the multimedia content. Delivering the sound and presentation real time to the audience.

3. **We have to provide a right procedure to protect the intellectual property of contents appear in the pages.** Intellectual property is the main content of the system. We put their works: papers, posters, and presentation slides on the website and let people look (and even download) the files. To respect their intellectual property, we have to make a confirmation first whether they want to publish their works or not. If they want to publish, we have to track and record who downloaded the works. This situation is mutualism, where people can get the authors' works and the authors can get the downloader information. The information can be used to make a correspondence so that the author knows who are interested in his/her works.

4. **A cheap and reliable solution should be chosen.** We need a cheap system (of course as opposed to the proprietary system) but reliable. We decided to use Open Source software and technology because of their cost-effective and reliability.

5. **The system should be easy to use and operate by everyone.** The system should be easy to operate because it will serve people from different backgrounds. Several people are able to operate the system, but people with some limitations may have difficulties when operate it.

2.1 System Overview

Figure 1 shows the general overview of how the system works. User interact with the web browser to access the online conference system. Through the Internet connection, content database contained with presentation slides, posters, and recorded video will be contacted and content will be loaded into the conference system. Here, we use separate streaming server to handle live audio streaming. In practice, we use audio streamer to stream audio to the streaming server. The streaming server then hooked by the client application to broadcast the audio streaming.

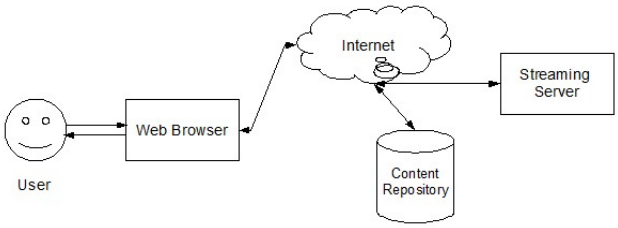

Figure 1: General system overview

3 Implementation

We have implemented the system at ATBC [1] Conference 2010, held in Sanur Bali. This event is the conference about Biological, Conservation, and Biodiversity in tropical region where researchers and practitioners from all over the world, especially they who has interest in tropical ecosystem. Our goal is to provide a conference system, so that it can be accessed by people outside. We have to provide online slide presentation (synchronous), live audio streaming, and provide the authors works (presentation slides, videos and posters) as shown in Figure 2.

Figure 2: Facilities that are provided by the system

The conference has six parallel sessions so that we have to capture the event on the same time. What we need is we access the system and make it capture all events in each session. To capture the sound, we simply use microphone headset attached on the nearest speaker. The sound stream is then attached to one host (and its port) by using any live audio streamer, e.g. DarkIce. The stream then broadcasted by the client when it calls the host.

Because we need to capture event on each room, so we need to run our system simultaneously. Each room needs at least two operators, one who will navigate the slide and one to take a video of the presenter. Unfortunately, due to the network problems the video can not be uploaded at the same time as the presentation goes. The videos are uploaded after the presentation finish by batch uploads.

Briefly, the system can provide the audience with several functions:

1. **As a scheduler** where a timetable showing the presentation schedule can be viewed by the audience. Making them can have information about who will present and what will they present. The timetable also can help audience to arrange their time so that they can still follow the presentation (Figure 3).

Figure 3: Timetable shows the schedule of events

2. **As a virtual conference rooms** where audience can feel as if they were in the real conference. We provide block-rooms with the title and author's presentation (Figure 4) enabling audience to see the running sessions. If they are interested in one presentation, they can enter the presentation by clicking "Enter Room". Then, as shown in Figure 5, they will enter the room with the presentation slide, audio streaming, and chat-box.

3. **As file repository.** The file repository contains work from the authors, including their posters (Figure 6) and their recorded presentations (Figure 7). All works published in the repository must have author's permission to respect their intellectual property.

Figure 4: A container with the running sessions

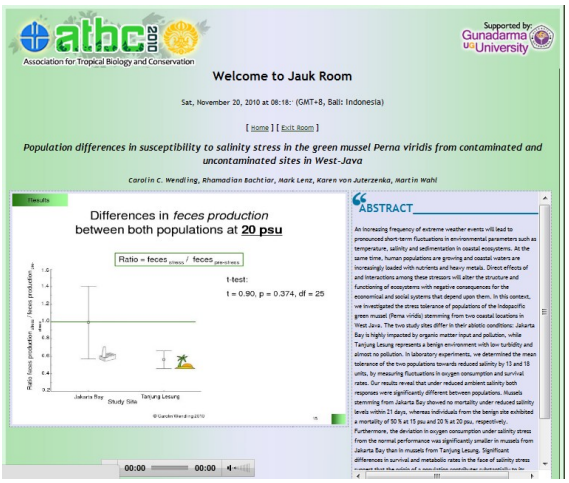

Figure 5: The virtual presentation room

During the ATBC we have several experience sin using the system:

- For the audio streaming, the connection using Wireless USB modem is sufficient. It shows that the system does not require high bandwidth to be useful
- The mobile devices is sufficient enough to use the live conference system. This results promises a new direction of the live conference system for country like Indonesia, which has the big number mobile users.
- The process that requires high bandwidth is the upload process of presentation slides.

4 Conclusion

Having implemented in the ATBC 2010 conference, it shows that this system can running well along the conference. However, we still encounter some problems regarding to the scheduling of the session. The schedule was changed so often and in several cases the online presentation was not same as the running presentation. This mainly caused

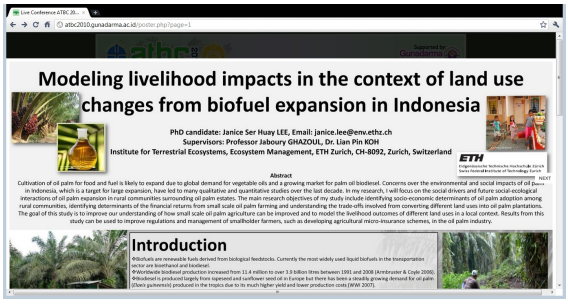

Figure 6: Posters repository

Figure 7: Recorded presentation

by the authors who wants to rearrange their schedule forward (or backward) and unfortunately the registration system was not integrated with the online conference system. This problem wake us up to also considering dynamic scheduling so that the changes of presentation can be rearranging easily.

The success implementation in the ATBC conference give us motivation to develop this system better and will also implement in other conferences. Make the knowledge spread wider by enabling people joined the conference virtually and gain benefit of attending it.

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